



Nanoquest III

Ion Beam Etching System



Versatile and Economical

- ◆ Independent control of ion energy, ion current density, and incidence angle
- ◆ New generation of contamination resistant filamentless Ion Source
- ◆ Uniform etching of noble metals and exotic material thin films

Superior Etch Uniformity

- ◆ System utilizes substrate rotation and improved ion beam optics
- ◆ Stage has adjustable angle of incidence to further optimize your process and clean up secondary side wall deposition

Direct Water Cooled Stage

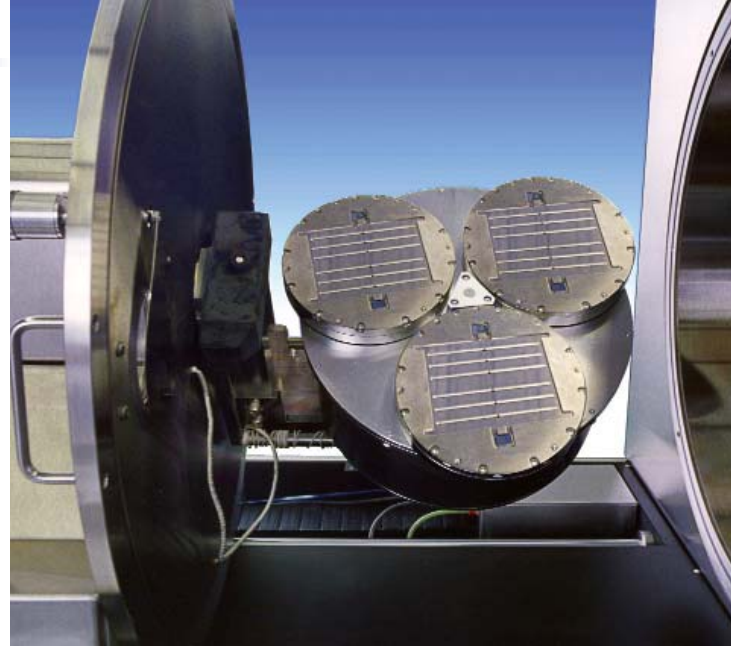
- ◆ Can accommodate up to 3 platens for maximum throughput
- ◆ Flat plate planetary motion stage with variable incident angle
- ◆ Direct water-cooled platens



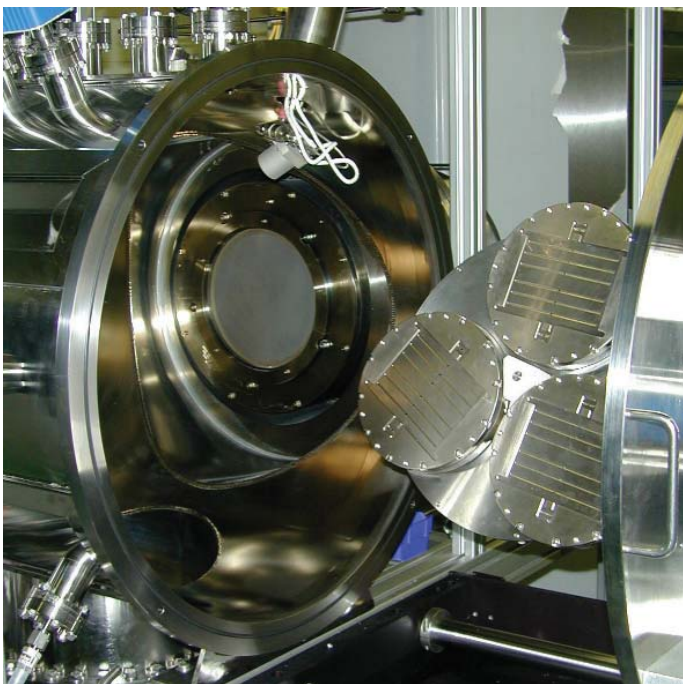


Ion Beam Etching System

The INTLVAC Nanoquest III Ion Beam Etching System is one of the most economical and versatile ion beam etching platforms. Due to the independent control of ion energy, ion current density, and incidence angle, and ion beam processing, it offers a highly controllable etching technology. Designed as a general purpose etch tool, the system is capable of performing processes ranging from a simple inert etch to complex reactive applications. The system utilizes substrate rotation and substrate offset to achieve superior etching uniformity. The stage has an adjustable angle of incidence to further optimize your process.



INTLVAC's Nanoquest III Ion Beam Etching System combines a water-cooled, rotating stage, a 22 cm filamentless ion source, an easily accessible stainless steel vacuum chamber, cryogenic high vacuum pumping system, automatic pump down and venting, atmosphere to high vacuum gauging, mass flow controllers, chamber cabinet, and electronic control console.



System Configuration and Layout

The vacuum chamber is constructed using only stainless steel and UHV compatible fabricating techniques with an electro-polished outer surface for a clean and attractive appearance. Continuous stainless steel cooling channels are welded in a web-like pattern on the outside of the chamber to provide an efficient heat sink.

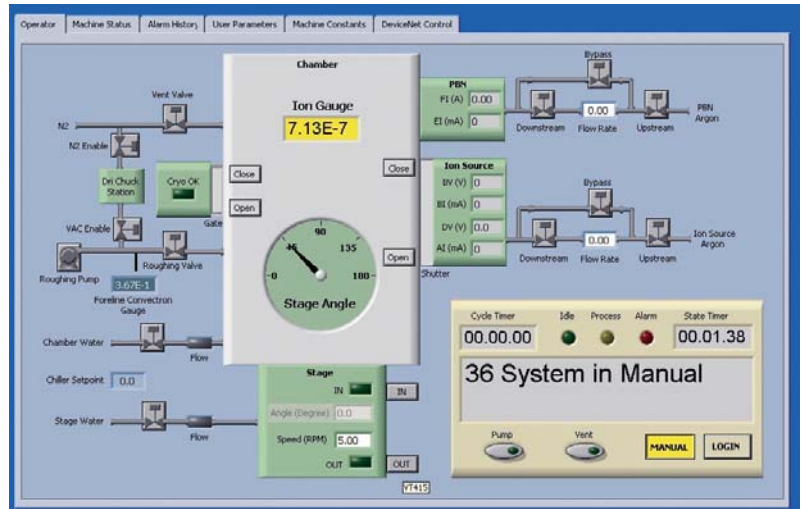
The vacuum chamber's single front door is mounted on a table assembly on which the direct water-cooled planetary stage is located. The heavy duty, door permits easy access to the stage and ion source for system maintenance.

ion beam etching

The Nanoquest system achieves 10^{-7} Torr using a combination of dry vacuum pumps. The Nanoquest may be configured with either Cryopump or Maglev Turbo pump.

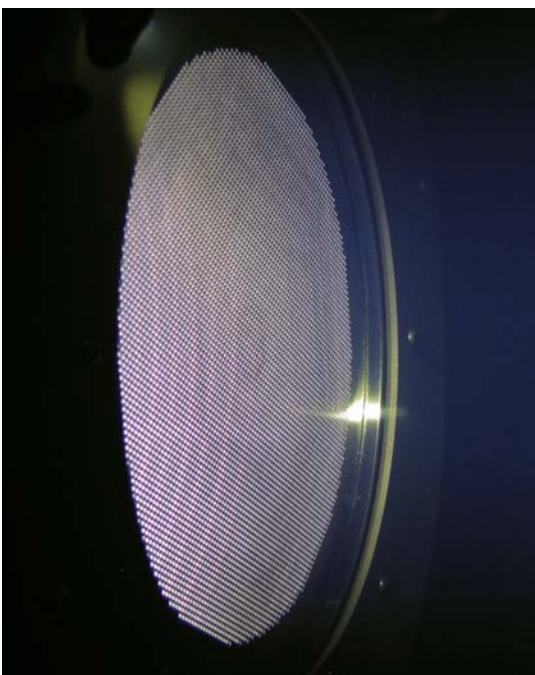
System Control and Monitoring

The LabVIEW based automated computer control system features total system management in an easy to use windows-based package. The LabVIEW Controller allows for automatic sequencing of electro-pneumatic actuators to pump the chamber down from atmosphere to high vacuum pumping. Venting of the system to atmosphere is achieved automatically with INTLVAC's AutoVac Controller.



22cm R.F. Ion Source

The 22cm ion beam source operates over a range of 100 to 1500eV, achieving ion beam currents over 1 Amp. Features of the 22cm ion source include:



- ◆ *Plasma Discharge Chamber:* High density plasma generated through RF ICP technology with filamentless ionization enabling long operation before maintenance
- ◆ *Ion Optics:* Self-aligning technology ensures repeatable process runs and longer grid lifetime and Molybdenum construction makes them robust and maintenance friendly
- ◆ *Modular Design:* Ion source is completely accessible from the chamber for easy serviceability. Internal mounts allow the throw distance to be optimized for etch rates and uniformity.
- ◆ *Power Supply:* Frequency matched RF power supply provides rapid response to changing conditions and provides improved contamination resistance.

Operation of the Ion source and Neutralizer is controlled by INTLVAC's LabView user interface with an Allen Bradley PLC controller.



SIMS End Point Detection

The Nanoquest III comes with an optional Quadrupole Mass Spectrometer end point detection system. Automated end point detection by Secondary Ion Mass Spectrometry provides precise, repeatable process control. Standard features include:

- ♦ High Sensitivity SIMS / MS with Pulse Ion Counting Detector
- ♦ Triple filter Quadrupole, 300 amu range is standard
- ♦ Differentially Pumped Manifold With Mounting Flange to Process Chamber
- ♦ Ion Optics with Energy Analyser and integral ioniser
- ♦ Penning Gauge and interlocks to provide over pressure protection
- ♦ Stability (less than $\pm 0.5\%$ height variation over 24 h)



Optional Features of the Nanoquest III

- ♦ Turbo pump and water vapor pump for reactive gas operation
- ♦ Integrated substrate chiller with programmed temperature profiles, which minimizes substrate stress during cool down, and warm substrates prior to chamber venting
- ♦ Additional process gas lines

Meeting customers needs worldwide

INTLVAC headquarters has state-of-the-art plant facilities in Ontario, Canada that enable assembly of vacuum systems and gas lines under cleanroom conditions.

We offer on-site installation and training for operators and maintenance personnel worldwide, insuring proper installation, process enhancements, and maximum equipment uptime.

Customer satisfaction

INTLVAC provides individual solutions for service and support issues to each customer, including Service Contracts, Preventative Maintenance, and Training in System Operation and Maintenance.

All INTLVAC systems equipped with components from selected suppliers are covered by a Comprehensive Warranty and meet International Standards. Our modular design allows for future upgrades of the systems.

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